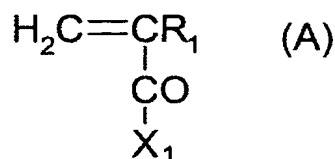


**WHAT IS CLAIMED IS:**

1. A photoprotective composition comprising at least one aqueous phase, at least one water-soluble or water-dispersible polymer having a diblock structure
- 5 A-B or a triblock structure B-A-B wherein A is an ionic water-soluble polymeric block and B is a hydrophobic polymeric block and at least one system screening out UV radiation, said at least one screening system comprising at least one 4,4-diarylbutadiene UV-A screening agent.
- 10 2. The photoprotective composition as defined by Claim 1, said ionic water-soluble block A comprising the polymerizate of one or more water-soluble monomers (Ia) or salts thereof, selected from among:
- (meth)acrylic acid,
- styrenesulfonic acid,
- 15 vinylsulfonic acid and (meth)allylsulfonic acid,
- vinylphosphonic acid,
- maleic acid,
- itaconic acid,
- crotonic acid,
- 20 dimethyldiallylammonium chloride,
- methylvinylimidazolium chloride,
- ethylenic carboxybetaines or sulfobetaines produced by quaternization of ethylenically unsaturated monomers containing an amine functional group, with sodium salts of a carboxylic acid having an active halogen or with cyclic
- 25 sulfones,
- water-soluble vinyl monomers of the following formula (A):



in which  $R_1$  is H,  $-CH_3$ ,  $-C_2H_5$  or  $-C_3H_7$  and  $X_1$  is selected from among:

- (i) alkyl oxides of the  $-OR_2$  type wherein  $R_2$  is a saturated or unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbon atoms, substituted with at least one sulfonic ( $-SO_3^-$ ) and/or sulfate ( $-SO_4^-$ ) and/or phosphate ( $-PO_4H_2^-$ ) and/or quaternary ammonium ( $-N^+R_3R_4R_5$ ) group in which  $R_3$ ,  $R_4$  and  $R_5$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of  $R_2 + R_3 + R_4 + R_5$  does not exceed 6; the radical  $R_2$  is optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); hydroxyl ( $-OH$ ); ether ( $-O-$ ); primary amine ( $-NH_2$ ); secondary amine ( $-NHR_6$ ) and/or tertiary amine ( $-NR_6R_7$ ) in which  $R_6$  and  $R_7$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of  $R_2 + R_6 + R_7$  does not exceed 6; and
- (ii)  $-NH_2$ ,  $-NHR_8$  and  $-NR_8R_9$  groups in which  $R_8$  and  $R_9$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the total number of carbon atoms of  $R_8 + R_9$  does not exceed 6, said  $R_8$  and/or  $R_9$  being substituted with at least one sulfonic ( $-SO_3^-$ ) and/or sulfate ( $-SO_4^-$ ) and/or phosphate ( $-PO_4H_2^-$ ) and/or quaternary amine ( $-N^+R_{10}R_{11}R_{12}$ ) group in which  $R_{10}$ ,  $R_{11}$  and  $R_{12}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of  $R_8 + R_9 + R_{10} + R_{11} + R_{12}$  does not exceed 6; the radicals  $R_8$  and/or  $R_9$  are optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a hydroxyl group ( $-OH$ ); an ether group ( $-O-$ ); a primary amine group ( $-NH_2$ ); a secondary amine group ( $-NHR_{13}$ ) and/or a tertiary amine group ( $-NR_{13}R_{14}$ ) in which  $R_{13}$  and  $R_{14}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of  $R_8 + R_9 + R_{13} + R_{14}$  does not exceed 6.

3. The photoprotective composition as defined by Claim 2, said ionic water-soluble block A also comprising the polymerizate of one or more neutral water-soluble monomers (Ib), selected from among:

(meth)acrylamide,

5 N-vinylacetamide and N-methyl-N-vinylacetamide,

N-vinylformamide and N-methyl-N-vinylformamide,

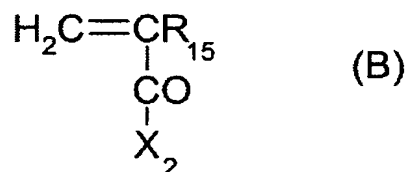
maleic anhydride,

vinylamine,

10 N-vinyl lactams containing a cyclic alkyl group having from 4 to 9 carbon atoms,

vinyl alcohol of formula  $\text{CH}_2 = \text{CHOH}$ ,

water-soluble vinyl monomers of the following formula (B):



15

in which  $\text{R}_{15}$  is H,  $-\text{CH}_3$ ,  $-\text{C}_2\text{H}_5$  or  $-\text{C}_3\text{H}_7$  and  $\text{X}_2$  is selected from among:

(i) alkyl oxides of  $-\text{OR}_{16}$  type wherein  $\text{R}_{16}$  is a saturated or unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbons, optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a hydroxyl group ( $-\text{OH}$ ); an ether group ( $-\text{O}-$ ); a primary amine group ( $-\text{NH}_2$ ); a secondary amine group ( $-\text{NHR}_{17}$ ) and/or a tertiary amine group ( $-\text{NR}_{17}\text{R}_{18}$ ) in which  $\text{R}_{17}$  and  $\text{R}_{18}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of  $\text{R}_{16} + \text{R}_{17} + \text{R}_{18}$  does not exceed 6; and

25 (ii)  $-\text{NH}_2$ ,  $-\text{NHR}_{19}$  and  $-\text{NR}_{19}\text{R}_{20}$  groups in which  $\text{R}_{19}$  and  $\text{R}_{20}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the total number of carbon atoms of  $\text{R}_{19} + \text{R}_{20}$  does not exceed 6, said  $\text{R}_{19}$  and  $\text{R}_{20}$  being optionally

substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a hydroxyl group (-OH); an ether group (-O-); a primary amine group (-NH<sub>2</sub>); a secondary amine group (-NHR<sub>21</sub>) and/or a tertiary amine group (-NR<sub>21</sub>R<sub>22</sub>) in which R<sub>21</sub> and R<sub>22</sub>, which may be identical or different, are each a saturated or unsaturated,

5 linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms of R<sub>19</sub> + R<sub>20</sub> + R<sub>21</sub> + R<sub>22</sub> does not exceed 6.

4. The photoprotective composition as defined by Claim 2, said ionic water-soluble block A also comprising the polymerizate of one or more hydrophobic  
10 monomers (Ic), said hydrophobic monomers being present in a sufficiently low quantity for the block A to be soluble in water.

5. The photoprotective composition as defined by Claim 4, said hydrophobic monomers (Ic) being selected from among:

15 styrene and its derivatives,

vinyl acetate of formula CH<sub>2</sub>=CH-OCOCH<sub>3</sub>,

vinyl ethers of formula CH<sub>2</sub>=CHOR in which R is a saturated or unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbon atoms,

20 acrylonitrile,

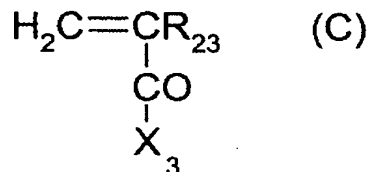
caprolactone,

vinyl chloride and vinylidene chloride,

silicone derivatives,

hydrophobic vinyl monomers of the following formula (C):

25



in which R<sub>23</sub> is H, -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub> or -C<sub>3</sub>H<sub>7</sub> and X<sub>3</sub> is selected from among:

(i) alkyl oxides of the  $-OR_{24}$  type wherein  $R_{24}$  is a saturated or unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbon atoms; and

5 (ii) the  $-NH_2$ ,  $-NHR_{25}$  and  $-NR_{25}R_{26}$  groups in which  $R_{25}$  and  $R_{26}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the total number of carbon atoms of  $R_{25} + R_{26}$  does not exceed 6.

6. The photoprotective composition as defined by Claim 1, said ionic water-  
10 soluble block A comprising polyethyleneimine.

7. The photoprotective composition as defined by Claim 1, said ionic water-  
soluble block A being completely or partially neutralized with an inorganic or  
organic base.

15 8. The photoprotective composition as defined by Claim 7, such neutralization being with an inorganic or organic base selected from among the salts of sodium, ammonium, lithium, calcium or magnesium; ammonium substituted with 1 to 4 alkyl groups having from 1 to 15 carbon atoms, or from  
20 mono-, di-, and triethanolamine, aminoethylpropanediol, N-methylglucamine, and basic amino acids and mixtures thereof.

9. The photoprotective composition as defined by Claim 1, said hydrophobic  
block B comprising the polymerizate of hydrophobic monomers (Id) selected  
25 from among:

styrene and derivatives thereof,  
vinyl acetate of formula  $CH_2=CH-OCOCH_3$ ,  
vinyl ethers of formula  $CH_2=CHOR'$  in which  $R'$  is a saturated or  
unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbons,  
30 acrylonitrile,  
vinyl chloride and vinylidene chloride,

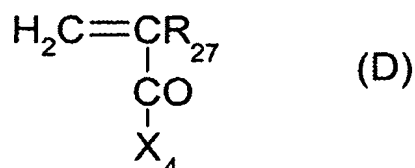
caprolactone,

alkenes,

silicone derivatives,

hydrophobic vinyl monomers of the following formula (D):

5



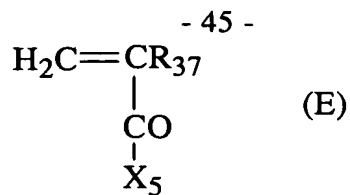
in which  $\text{R}_{27}$  is H,  $-\text{CH}_3$ ,  $-\text{C}_2\text{H}_5$  or  $-\text{C}_3\text{H}_7$  and  $\text{X}_4$  is selected from among:

- (i) alkyl oxides of the  $-\text{OR}_{28}$  type wherein  $\text{R}_{28}$  is a saturated or  
 10 unsaturated, linear or branched hydrocarbon radical having from 1 to 22 carbons, optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a sulfonic group ( $-\text{SO}_3^-$ ); a sulfate group ( $-\text{SO}_4^-$ ); a phosphate group ( $-\text{PO}_4\text{H}_2^-$ ); a hydroxyl group ( $-\text{OH}$ ); an ether group ( $-\text{O}-$ ); a primary amine group ( $-\text{NH}_2$ ); a secondary amine group ( $-\text{NHR}_{29}$ ) and/or a tertiary amine group ( $-\text{NR}_{29}\text{R}_{30}$ ) or a  
 15 quaternary amine group ( $-\text{N}^+\text{R}_{29}\text{R}_{30}\text{R}_{31}$ ) in which  $\text{R}_{29}$ ,  $\text{R}_{30}$  and  $\text{R}_{31}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 22 carbon atoms, provided that the sum of the carbon atoms of  $\text{R}_{28} + \text{R}_{29} + \text{R}_{30} + \text{R}_{31}$  does not exceed 22; and

- (ii)  $-\text{NH}_2$ ,  $-\text{NHR}_{32}$  and  $-\text{NR}_{32}\text{R}_{33}$  groups in which  $\text{R}_{32}$  and  $\text{R}_{33}$ , which may  
 20 be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 22 carbon atoms, provided that the total number of carbon atoms of  $\text{R}_{32} + \text{R}_{33}$  does not exceed 22, said  $\text{R}_{32}$  and  $\text{R}_{33}$  being optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a hydroxyl group ( $-\text{OH}$ ); an ether group ( $-\text{O}-$ ); a sulfonic group ( $-\text{SO}_3^-$ ); a sulfate  
 25 group ( $-\text{SO}_4^-$ ); a phosphate group ( $-\text{PO}_4\text{H}_2^-$ ); a primary amine group ( $-\text{NH}_2$ ); a secondary amine group ( $-\text{NHR}_{34}$ ) and/or a tertiary amine group ( $-\text{NR}_{34}\text{R}_{35}$ ) and/or a quaternary amine group ( $-\text{N}^+\text{R}_{34}\text{R}_{35}\text{R}_{36}$ ) in which  $\text{R}_{34}$ ,  $\text{R}_{35}$  and  $\text{R}_{36}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched

hydrocarbon radical having 1 to 22 carbon atoms, provided that the sum of the carbon atoms of  $R_{32} + R_{33} + R_{34} + R_{35} + R_{36}$  does not exceed 22 and further wherein  $R_{32}$  and  $R_{33}$  may also be a perfluoroalkyl radical.

- 5 10. The photoprotective composition as defined by Claim 9, said hydrophobic block B also comprising the polymerizate of one or more water-soluble monomers (Ie) and their salts; said water-soluble monomers being present in a sufficiently low quantity for the block B to be hydrophobic.
- 10 11. The photoprotective composition as defined by Claim 10, said water-soluble monomers (Ie) being selected from among:
- (meth)acrylic acid,
  - styrenesulfonic acid,
  - vinylsulfonic acid and (meth)allylsulfonic acid,
  - 15 vinylphosphonic acid,
  - maleic acid and anhydride,
  - itaconic acid,
  - crotonic acid,
  - dimethyldiallylammonium chloride,
  - 20 methylvinylimidazolium chloride,
  - (meth)acrylamide,
  - N-vinylacetamide and N-methyl-N-vinylacetamide,
  - N-vinylformamide and N-methyl-N-vinylformamide,
  - N-vinyllactams containing a cyclic alkyl group having from 4 to 9 carbon
  - 25 atoms,
- the vinyl alcohol of formula  $\text{CH}_2=\text{CHOH}$ ,
- 2-vinylpyridine and 4-vinylpyridine,
- water-soluble vinyl monomers of the following formula (E):



in which  $\text{R}_{37}$  is H,  $-\text{CH}_3$ ,  $-\text{C}_2\text{H}_5$  or  $-\text{C}_3\text{H}_7$  and  $\text{X}_5$  is selected from among:

- (i) alkyl oxides of the  $-\text{OR}_{38}$  type wherein  $\text{R}_{38}$  is a saturated or
  - 5 unsaturated, linear or branched hydrocarbon radical having from 1 to 6 carbon atoms, optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a sulfonic group ( $-\text{SO}_3^-$ ); a sulfate group ( $-\text{SO}_4^-$ ); a phosphate group ( $-\text{PO}_4\text{H}_2^-$ ); a hydroxyl group ( $-\text{OH}$ ); an ether group ( $-\text{O}-$ ); a primary amine group ( $-\text{NH}_2$ ); a secondary amine group ( $-\text{NHR}_{39}$ ) and/or a tertiary amine group ( $-\text{NR}_{39}\text{R}_{40}$ ) or a quaternary ammonium group ( $-\text{N}^+\text{R}_{39}\text{R}_{40}\text{R}_{41}$ ) in which  $\text{R}_{39}$ ,  $\text{R}_{40}$  and  $\text{R}_{41}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the carbon atoms  $\text{R}_{38} + \text{R}_{39} + \text{R}_{40} + \text{R}_{41}$  does not exceed 6; and
  - (ii)  $-\text{NH}_2$ ,  $-\text{NHR}_{42}$  and  $-\text{NR}_{42}\text{R}_{43}$  groups in which  $\text{R}_{42}$  and  $\text{R}_{43}$ , which may
    - 15 be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the total number of carbon atoms of  $\text{R}_{42} + \text{R}_{43}$  does not exceed 6, said  $\text{R}_{42}$  and/or  $\text{R}_{43}$  being optionally substituted with a halogen atom (iodine, bromine, chlorine, fluorine); a sulfonic group ( $-\text{SO}_3^-$ ); a sulfate group ( $-\text{SO}_4^-$ ); a phosphate group ( $-\text{PO}_4\text{H}_2^-$ ); a
    - 20 hydroxyl group ( $-\text{OH}$ ); an ether group ( $-\text{O}-$ ); a primary amine group ( $-\text{NH}_2$ ); a secondary amine group ( $-\text{NHR}_{44}$ ) and/or a tertiary amine group ( $-\text{NR}_{44}\text{R}_{45}$ ) or a quaternary amine group ( $-\text{N}^+\text{R}_{44}\text{R}_{45}\text{R}_{46}$ ) in which  $\text{R}_{44}$ ,  $\text{R}_{45}$  and  $\text{R}_{46}$ , which may be identical or different, are each a saturated or unsaturated, linear or branched hydrocarbon radical having 1 to 6 carbon atoms, provided that the sum of the
    - 25 carbon atoms of  $\text{R}_{42} + \text{R}_{43} + \text{R}_{44} + \text{R}_{45} + \text{R}_{46}$  does not exceed 6.

12. The photoprotective composition as defined by Claim 1, said diblock or triblock polymer having a molar mass ranging from 1,000 g/mol to 500,000 g/mol.



13. The photoprotective composition as defined by Claim 1, said ionic water-soluble block A having a molar mass ranging from 600 g/mol to 300,000 g/mol.
14. The photoprotective composition as defined by Claim 1, said hydrophobic  
5 block B having a molar mass ranging from 400 g/mol to 200,000 g/mol.
15. The photoprotective composition as defined by Claim 1, the proportion by mass of the ionic hydrophilic block A in the diblock polymers A-B being greater than 60%.
- 10 16. The photoprotective composition as defined by Claim 1, the proportion by mass of the ionic hydrophilic block A in the triblock polymers B-A-B being greater than 50%.
- 15 17. The photoprotective composition as defined by Claim 1, the diblock or triblock polymers comprising an ionic water-soluble polymeric block A which is completely water-soluble and hydrophobic polymeric blocks B which are completely hydrophobic.
- 20 18. The photoprotective composition as defined by Claim 1, said diblock polymers comprising polystyrene/sodium polyacrylate diblock polymers.
19. The photoprotective composition as defined by Claim 18, the diblock polymer comprising:
- 25 the polystyrene (2,000 g/mol)-sodium polyacrylate (11,500 g/mol) diblock polymer wherein the water-soluble ionic block (sodium polyacrylate) constitutes 85.2% of the total weight of the diblock polymer;
- the polystyrene (1,800 g/mol)-sodium polyacrylate (42,450 g/mol) diblock polymer wherein the water-soluble ionic block (sodium polyacrylate) constitutes
- 30 95.9% of the total weight of the diblock polymer; or
- the polystyrene (4,300 g/mol)-sodium polyacrylate (25,460 g/mol) diblock

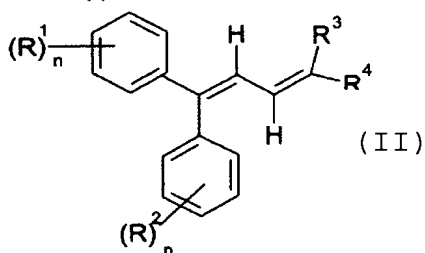
polymer wherein the water-soluble ionic block constitutes 85.55% of the total weight of the diblock copolymer.

20. The photoprotective composition as defined by Claim 1, the triblock polymers comprising polystyrene/sodium polyacrylate/polystyrene triblock polymers.

21. The photoprotective composition as defined by Claim 20, the triblock polymer comprising the polystyrene (2,500 g/mol)-sodium polyacrylate (29,800 g/mol)-polystyrene (2,500 g/mol) triblock polymer wherein the quantity of water-soluble block constitutes 85.63% of the total weight of the triblock copolymer.

22. The photoprotective composition as defined by Claim 1, wherein the concentration by mass of the diblock or triblock polymer in the composition ranges from 0.01 % to 30% by weight relative to the total weight of the composition.

23. The photoprotective composition as defined by Claim 1, said at least one 4,4-diarylbutadiene UV-A-screening agent having the following formula (II):



in which the diene system is of the Z,Z; Z,E; E,Z or E,E configuration or mixture of said configurations, and wherein:

R<sup>1</sup> and R<sup>2</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>2</sub>-C<sub>10</sub> alkenyl radical, a C<sub>1</sub>-C<sub>12</sub> alkoxy radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl

- radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>1</sub>-C<sub>20</sub> alkoxy carbonyl radical, a C<sub>1</sub>-C<sub>12</sub> monoalkylamino radical, a C<sub>1</sub>-C<sub>12</sub> dialkylamino radical, an aryl radical, a heteroaryl radical or a water-solubilizing substituent selected from among a carboxylate residue, a sulfonate residue or an ammonium residue;
- 5 R<sup>3</sup> is a group COOR<sup>5</sup>, COR<sup>5</sup>, CONR<sup>5</sup>R<sup>6</sup>, CN, O=S(-R<sup>5</sup>)=O, O=S(-OR<sup>5</sup>)=O, R<sup>7</sup>O-P(-OR<sup>8</sup>)=O, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>2</sub>-C<sub>10</sub> alkenyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkenyl radical, an optionally substituted C<sub>6</sub>-C<sub>18</sub> aryl radical, an optionally substituted C<sub>3</sub>-C<sub>7</sub> heteroaryl radical;
- 10 R<sup>4</sup> is a group COOR<sup>6</sup>, COR<sup>6</sup>, CONR<sup>5</sup>R<sup>6</sup>, CN, O=S(-R<sup>6</sup>)=O, O=S(-OR<sup>6</sup>)=O, R<sup>7</sup>O-P(-OR<sup>8</sup>)=O, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>2</sub>-C<sub>10</sub> alkenyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkenyl radical, an optionally substituted C<sub>6</sub>-C<sub>18</sub> aryl radical, an optionally substituted C<sub>3</sub>-C<sub>7</sub> heteroaryl radical;
- 15 the radicals R<sup>5</sup> to R<sup>8</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>2</sub>-C<sub>10</sub> alkenyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> bicycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> cycloalkenyl radical, an optionally substituted aryl radical, an optionally substituted heteroaryl radical, and
- 20 n ranges from 1 to 3; with the proviso that the radicals R<sup>3</sup> to R<sup>8</sup> can together form, with the carbon atoms from which they depend, a C<sub>5</sub>-C<sub>6</sub> ring which may be fused.

24. The photoprotective composition as defined by Claim 23, wherein
- 25 formula (II):
- n = 1 or 2;
- R<sup>1</sup> and R<sup>2</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>1</sub>-C<sub>12</sub> alkoxy radical, a C<sub>1</sub>-C<sub>12</sub> monoalkylamino radical, a C<sub>1</sub>-C<sub>12</sub> dialkylamino radical, a water-solubilizing substituent selected from among
- 30 oxylate group, a sulfonate group or an ammonium residue;
- R<sup>3</sup> is a group COOR<sup>5</sup>, COR<sup>5</sup>, CONR<sup>5</sup>R<sup>6</sup>, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>3</sub>-C<sub>10</sub>

cycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, optionally substituted phenyl, naphthyl or thienyl;

R<sup>4</sup> is a group COOR<sup>6</sup>, COR<sup>6</sup>, CONR<sup>5</sup>R<sup>6</sup>, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>3</sub>-C<sub>6</sub> cycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, optionally substituted phenyl, naphthyl or thienyl;

the radicals R<sup>5</sup> and R<sup>6</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>12</sub> alkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> bicycloalkenyl radical, optionally substituted phenyl or naphthyl.

10

25. The photoprotective composition as defined by Claim 24, wherein formula (II):

R<sup>1</sup> and R<sup>2</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>1</sub>-C<sub>20</sub> alkoxy radical, a water-solubilizing substituent selected from

15 among a carboxylate group, a sulfonate group or an ammonium residue;

R<sup>3</sup> is a group COOR<sup>5</sup>, COR<sup>5</sup>, CONR<sup>5</sup>R<sup>6</sup>;

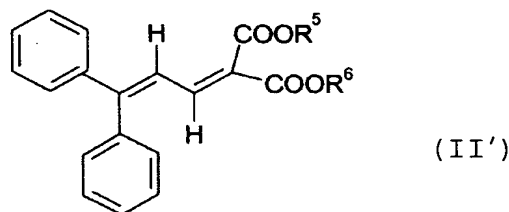
R<sup>4</sup> is a group COOR<sup>6</sup>, COR<sup>6</sup>, CONR<sup>5</sup>R<sup>6</sup>; and

the radicals R<sup>5</sup> and R<sup>6</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>12</sub> alkyl radical, a C<sub>3</sub>-C<sub>6</sub> cycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a

20 C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> bicycloalkenyl radical, optionally substituted phenyl or naphthyl.

26. The photoprotective composition as defined by Claim 25, said at least one compound of formula (II) having the following formula (II'):

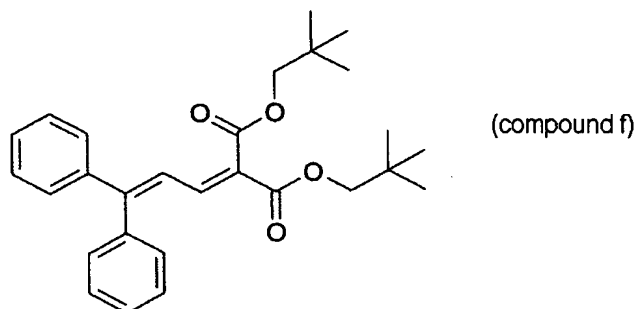
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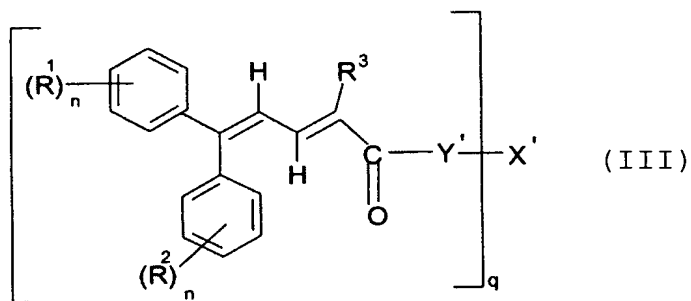
wherein the radicals R<sup>5</sup> and R<sup>6</sup>, which may be identical or different, are each

hydrogen, a C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>3</sub>-C<sub>6</sub> cycloalkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical.

27. The photoprotective composition as defined by Claim 26, the compound of formula (II') being the 1,1-dicarboxy(2'2'-dimethylpropyl)-4,4-diphenylbutadiene derivative having the structure:



28. The photoprotective composition as defined by Claim 1, said at least one 4,4-diarylbutadiene UV-A-screening agent having the following formula (III):



in which the diene system is of the Z,Z; Z,E; E,Z or E,E configuration or mixture of said configurations and wherein:

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and n have the meanings indicated in the formula (II);

Y' is a group -O- or -NR<sup>9</sup>-;

R<sup>9</sup> is hydrogen, a linear or branched C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>2</sub>-C<sub>10</sub> alkenyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, a

C<sub>3</sub>-C<sub>10</sub> cycloalkenyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkenyl radical, an aryl radical, a

heteroaryl radical;

X' is a residue of a linear or branched, aliphatic or cycloaliphatic C<sub>2</sub>-C<sub>20</sub> polyol comprising from 2 to 10 hydroxyl groups and having the valency q; with the proviso that the carbon chain of said residue may be interrupted by one or more sulfur or oxygen atoms, one or more imine groups, one or more C<sub>1</sub>-C<sub>4</sub> alkylimino groups; and q ranges from 2 to 10.

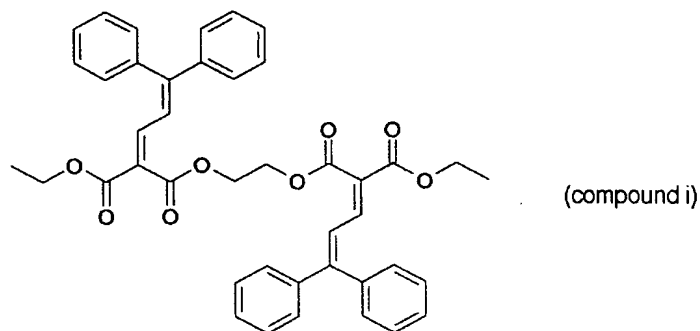
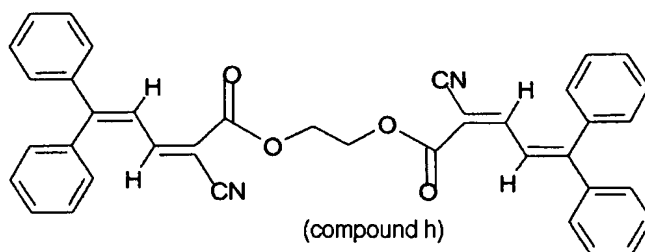
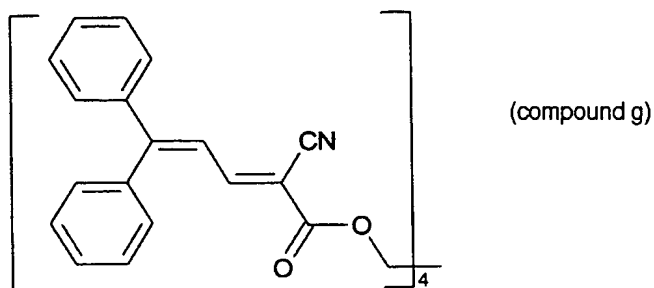
29. The photoprotective composition as defined by Claim 28, wherein formula (III):  
R<sup>1</sup> and R<sup>2</sup>, which may be identical or different, are each hydrogen, a C<sub>1</sub>-C<sub>12</sub> alkyl radical, a C<sub>1</sub>-C<sub>8</sub> alkoxy radical, a water-solubilizing substituent selected from among a carboxylate group, a sulfonate group or an ammonium residue;  
R<sup>3</sup> is a group COOR<sup>5</sup>, CONR<sup>5</sup>R<sup>6</sup>, CN, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical;  
R<sup>5</sup> and R<sup>6</sup>, which may be identical or different, are each a linear or branched C<sub>1</sub>-C<sub>20</sub> alkyl radical, a C<sub>3</sub>-C<sub>10</sub> cycloalkyl radical, a C<sub>7</sub>-C<sub>10</sub> bicycloalkyl radical, optionally substituted naphthyl or phenyl; and  
X' is a C<sub>2</sub>-C<sub>20</sub> polyol residue comprising from 2 to 6 hydroxyl groups.

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30. The photoprotective composition as defined by Claim 28, wherein formula (III), X' is an ethanol or pentaerythritol residue.

31. The photoprotective composition as defined by Claim 30, said at least one compound of formula (III) being selected from among the following compounds:

25



32. The photoprotective composition as defined by Claim 1, said at least one 4,4-diarylbutadiene compound comprising from 0.1 % to 20% by weight relative to the total weight of the composition.

33. The photoprotective composition as defined by Claim 1, further comprising at least one additional organic or inorganic sunscreensing agent active in the UV-A and/or UV-B regions, water-soluble, fat-soluble or insoluble in the commonly used cosmetic solvents.

34. The photoprotective composition as defined by Claim 33, comprising at least one additional organic screening agent selected from among the anthranilates; cinnamic derivatives; dibenzoylmethane derivatives; salicylic derivatives, camphor derivatives; triazine derivatives; benzophenone derivatives;

$\beta,\beta'$ -diphenyl acrylate derivatives; benzotriazole derivatives; benzalmalonate derivatives; benzimidazole derivatives; imidazolines; bis-benzoazolyl derivatives; p-aminobenzoic acid (PABA) derivatives; benzoxazole derivatives; methylenebis(hydroxyphenylbenzotriazole) derivatives; screening polymers and  
5 screening silicones; dimers derived from  $\alpha$ -alkylstyrene and mixtures thereof.

35. The photoprotective composition as defined by Claim 34, said at least one additional organic screening agent comprising:
- Ethylhexyl Salicylate,
- 10 Ethylhexyl Methoxycinnamate,
- Octocrylene,
- Butyl Methoxydibenzoylmethane,
- Phenylbenzimidazole Sulfonic Acid,
- Benzophenone-3,
- 15 Benzophenone-4,
- Benzophenone-5,
- n-Hexyl 2-(4-diethylamino-2-hydroxybenzoyl)benzoate,
- 4-Methylbenzylidene camphor,
- Terephthalylidene Dicamphor Sulfonic acid,
- 20 Disodium Phenyl Dibenzimidazole Tetra-sulfonate,
- 2,4,6-Tris(4'-diisobutyl aminobenzalmalonate)S-triazine
- Anisotriazine,
- Ethylhexyl triazone,
- Diethylhexyl Butamido Triazone,
- 25 Methylene bis-Benzotriazolyl Tetramethylbutylphenol,
- Drometrizole Trisiloxane,
- Polysilicone 15,
- 2,4-Bis-[5-1-(dimethylpropyl)benzoxazol-2-yl-(4-phenyl)imino]-6-(2-ethylhexyl)imino-1,3,5-triazine,
- 30 and mixtures thereof.



36. The photoprotective composition as defined by Claim 33, comprising at least one additional inorganic screening agent selected from among metal oxide pigments or nanopigments, whether coated or uncoated.
- 5 37. The photoprotective composition as defined by Claim 33, said at least one additional inorganic screening agent comprising nanopigments of titanium oxide, which is amorphous or crystallized, in rutile and/or anatase form, iron oxide, zinc oxide, zirconium oxide or cerium oxide.
- 10 38. The photoprotective composition as defined by Claim 1, further comprising at least one agent for artificial bronzing and/or tanning of the skin.
39. The photoprotective composition as defined by Claim 1, further comprising at least one cosmetic adjuvant selected from among organic solvents,  
15 ionic or nonionic thickeners, demulcents, humectants, active agents, opacifying agents, stabilizers, emollients, silicones, insect repellents, perfumes, preservatives, surfactants, fillers, pigments, polymers, propellants, alkalinizing or acidifying agents or any other ingredient commonly employed in the cosmetic and/or dermatological field.
- 20 40. The photoprotective composition as defined by Claim 1, formulated as a lotion or serum with no fatty phase, an oil-in-water or water-in-oil emulsion, a multiple emulsion, a microemulsion, a vesicular dispersion of the ionic and/or nonionic type, or of a wax/aqueous phase dispersion.
- 25 41. The photoprotective composition as defined by Claim 1, formulated as an oil-in-water or water-in-oil emulsion containing at most 1 % by weight of emulsifying surfactant relative to the total weight of the composition.
- 30 42. A method for the photoprotection of the skin, lips and/or hair against the damaging effects of UV-radiation, comprising topically applying thereon, a thus

effective amount of a photoprotective composition comprising at least one aqueous phase, at least one water-soluble or water-dispersible polymer having a diblock structure A-B or a triblock structure B-A-B wherein A is an ionic water-soluble polymeric block and B is a hydrophobic polymeric block and at least one  
5 system screening out UV radiation, said at least one screening system comprising at least one 4,4-diarylbutadiene UV-A screening agent.